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Environmental and conservation volunteering as workplace integrated learning for university students

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This research paper introduces the concept and practice of tertiary sciences students doing environmental volunteering, also known as conservation volunteering, as a core part of their course. First year Natural Sciences students at Edith Cowan University do five days environmental volunteer work with community groups as a practicum, currently known as Workplace Integrated Learning (WIL). Initial research data displays the number of volunteer hours done by students in various types of activities, locations and organisations. Preliminary quantitative evaluations and qualitative comments demonstrate students' positive attitudes and outcomes from their volunteering experiences. Definitions and classifications of volunteering and WIL from current literature are discussed as part of the curriculum design review process. Initial data from host organisations and students suggests that volunteering, and environmental volunteering in particular, can contribute to employability skills, although the program needs to be evaluated as one component of an integrated program of WIL that the students are required to complete. Students learn about potential careers and the environment industry's reliance on volunteers. Students learn and practise specific skills (e.g. animal handling) and contribute to communities and the environment.

Introduction

Community engagement and workplace integrated learning (WIL), by a variety of names, are key elements in the strategic direction of many Australian universities, providing a bridge between students' academic work and their professional future (Martin, Fleming, Ferkins, Wiersma & Coll, 2010). Edith Cowan University (ECU) seeks to enhance student learning by incorporating WIL and other community engagement strategies, aiming to engender in students a sense of community connection and consciousness (Edith Cowan University, 2010). At ECU, *workplace integrated learning* (WIL) is viewed as a distinctive form of learning experience that incorporates students being in a workplace setting (Edith Cowan University, 2010), providing many learning opportunities denied in classroom settings. "Workplace" rather than "work" is specifically used to acknowledge valuable professional and personal skills that students learn in a workplace that are not directly part of work. WIL uses a workplace as a vehicle for learning. Yet learning is more than a by-product of work, it is fundamental to engaging in work practice (Smith, Meijer & Kielly-Coleman, 2010). The learning may or may not align with the higher education qualification being studied and may target generic skills in addition to subject-specific knowledge and practice.

This research paper provides an innovative example of incorporating WIL into the student experience. The purposes of this paper are threefold: 1) to describe environmental volunteering by School of Natural Sciences students as part of their core first year practicum while focusing on student outcomes; 2) to explore the value of such volunteering to both students and the organisations involved based on preliminary

analysis of evaluations from 2012; and 3) to position the WIL experience against current definitions and models of work integrated learning, service learning (Cooper, Orrell & Bowden, 2010; Groenewald, Drysdale, Chiupka & Johnston, 2011), work-based learning (Boud & Solomon, 2001; Costley, 2007), non-work integrated learning (Harvey, Geall & Moon, 1998) and volunteering. Many benefits of WIL and volunteering are highlighted and pertinent issues are discussed, integrating discipline theory and knowledge with the professional environment.

Workplace integrated learning (WIL)

Work integrated learning (WIL) is “an umbrella term for a range of approaches and strategies that integrate theory with the practice of work within a purposefully designed curriculum” with WIL placement being “a type of WIL that requires the student to be situated in the workplace” (Patrick et al., 2008). For the sake of ease of language, this paper will use the term *workplace integrated learning* (Edith Cowan University, 2010) for work-based learning (Boud & Solomon, 2001), learning in the workplace and community (LiWC) (Victoria University, 2012), work integrated learning (Cooper et al., 2010; Patrick et al., 2008) and work experience (Little, Moon, Pierce, Harvey & Marlow-Hayne, 2001).

There are several classifications of WIL. For example, three models of WIL in Cooper et al.’s (2010) classification are professional programs, service learning and cooperative learning. Other theoretical frameworks include the six characteristics of work-based learning that Boud et al. (2001) advocate, non-work integrated learning (Harvey, et al., 1998), and the seven key dimensions and three models of work integrated learning (Cooper, et al., 2010). The *Taxonomy of WIL* (TWIL) is a recent classification of WIL which has four categories: community and service-focussed employment, required professional practice, field and industry based work experience and other WIL opportunities (Groenewald, et al., 2011). Another recent definition is an inclusive classification, stating that: “work-based learning logically refers to all and any learning that is situated in the workplace or arises directly out of workplace concerns” (Lester & Costley, 2010). Smith et al. (2009) agree, defining WIL as learning which is embedded in the experience of work whether paid or unpaid, full time or part time, formally endorsed as part of a university course, or extra-curricular and complementary or totally independent of studies, which is made meaningful for a student when reflected upon as part of career development.

WIL is an authentic socio-cultural experience; learning is embedded and embodied in the contexts of the learners and their work environment (Choy & Delahaye, 2009). Students apply generic and specific knowledge and practical skills from on campus or online learning to a workplace setting and ideally they then apply knowledge and skills from the workplace setting to university learning. The interdependency of knowing and doing provide the epistemological base for work-based learning which is rooted in pragmatism (Lester & Costley, 2010), highlighting the rationale for WIL to be incorporated throughout higher education courses. Academics who view their teaching primarily as preparing students to become capable professionals who are competent to practice in

their profession may see students' ability to apply knowledge to practice in a professional setting as a key indicator of quality university-based curricula (McAllister et al., 2011).

Volunteering

As in many other countries, Australia has a strong tradition of volunteering, reflecting the character of the nation (Australian Government, 2011). Australia's National Volunteering Strategy encourages educational providers to promote, support and recognise volunteering in schools and universities (Australian Government, 2011). Attracting young people to volunteering is vital for sustaining volunteering capacity into the future (Australian Government, 2011). It is recognised that integrated approaches are needed at national and institutional level to support the development of university student volunteering (Darwen & Rannard, 2011).

Volunteering can be an important way for young people to develop confidence and skills offering a clear pathway to social and economic participation in the future (Australian Government, 2011). Schools and universities have increasingly introduced volunteering programs for students to develop a sense of social responsibility, connectedness and leadership as well as to develop employability skills (Australian Government, 2011). Higher education student volunteering has caught the imagination of policy makers and practitioners in recent years (Holdsworth & Quinn, 2010). While recent initiatives to promote student volunteering in the UK have been welcomed, relatively little has been documented about its use and role in higher education and its assumed benefits (Holdsworth & Quinn, 2010).

Although there is no agreed definition of volunteering, the three criteria of free will, non-pecuniary motivation and benefit to others can be applied to an action to assess whether it is volunteerism (Hockenos, 2011). Another description or definition differs: all volunteering involves freely giving time to help others or support a cause, yet some people may be reimbursed for the cost of volunteering (Australian Government, 2011). Volunteering may be viewed broadly to include tertiary students volunteering as part of their course, particularly in the field of environmental volunteering.

The example of environmental volunteering described in this paper does fit all the criteria of volunteering outlined above. Although it would be classified as a form of volunteering by these descriptions, it is not according to the Australian Bureau of Statistics (ABS) as they define a volunteer as someone who willingly gives unpaid help in the form of time, service or skills through an organisation or group. Unpaid work under some form of compulsion, for example as part of study commitments, is excluded from ABS measures (Australian Bureau of Statistics, 2010). The students described in this paper do not gain university credit but must complete the unit in order to graduate. Assessment for the university unit described is evidence of participation as Pass/Fail and listed on academic transcripts as part of the course. However, the compulsion in this case is a minimum amount of volunteering, with students being free to choose the type of work and organisation.

One commonly held misconception is that young people do not volunteer (Hockenos, 2011). Roughly thirty percent of the Australian population aged 25-34 volunteered in 2010 with 27% in 18-24 year age bracket (Australian Bureau of Statistics, 2011), less than the national average of 36% (Australian Government, 2011). People of 35-44 and 65-74 years were more likely to volunteer than those in younger and older age groups (Australian Bureau of Statistics, 2010) with people aged 45-54 years reporting the highest rate of volunteering (Australian Bureau of Statistics, 2011). In Western Australia (WA), 75.6 % of volunteers are motivated to continue to volunteer by giving something back to the community and 82.5% of 18-24 year olds are motivated to continue to volunteer by having fun (Volunteering WA, 2011).

Student volunteering makes a relatively small contribution to the voluntary sector in terms of number of participants and scope, but it reinforces an ideal of self-reliance and relates to the development of employability skills (Holdsworth & Quinn, 2010). However, data on tertiary student volunteering is not readily available. Volunteering has the potential to foster a form of moral engagement that recognises the need to take responsibility for others, but not necessarily as the 'privileged server' to the 'unprivileged recipient' (Holdsworth & Quinn, 2010). Students are becoming more aware of the need to extend their curriculum vitae and this future benefit for their own career prospects is motivating some to undertake volunteering (Holdsworth & Quinn, 2010). Recruitment for volunteering positions may require selection processes including applications (typically comprising a curriculum vitae and statements addressing selection criteria) and interview. So the application process provides students with worthwhile experiences during the recruitment process before the actual experience of volunteering, including the potential of not being accepted. Volunteering as unpaid work or service which contributes to the work of a formal organisation and is managed by a workplace model differs from volunteering as activism or as leisure according to Rochester's three perspectives (K. A. Smith & Cordery, 2010).

Conservation volunteering for environmental sustainability education

Environmental education has broad responsibilities to expand consciousness of the need to apply sustainability principles collectively and in our everyday lives (Haigh, 2006). Such education does not necessarily need to be in the classroom, and indeed informal environmental education, such as field work and work experience, can be an effective way of increasing understanding of environmental and sustainability issues, whilst also promoting ongoing learning and greater personal involvement in environmental action (Haigh, 2006). This highlights the rationale for environmental volunteering and WIL to be incorporated throughout higher education courses. Many non-government organisations (NGOs) are based on the notion that a community of people can improve the world via a collective effort across many locally-based projects. The hard, slow tasks of environmental conservation, education and restoration may not gain media attention but through this direct, practical experience people learn how to care for and respect nature. Internationally, volunteering makes major contributions to conservation of biodiversity and improved sustainability outcomes, especially in developing countries (Devereux,

2008). Conservation volunteering may offer the opportunity to make a difference to specific environmental projects through a politically and economically appealing model of social enterprise (Lorimer, 2010).

Edith Cowan University is engaging with NGOs and other community-based environmental stewardship organisations (community groups) to encourage tertiary students to become involved in their local environmental issues and projects in practical ways. Environmental volunteers are generally not strongly motivated by reasons that one might expect from the general volunteering literature (Wahl, 2010). So data on these tertiary students' motivation will make a useful contribution to and comparison with the literature.

While the trend in higher education is for increasing student volunteering and involvement in community activities, there has been little research on the effects of the experience on volunteers, especially in the context of conservation and environment (Bruyere & Rappe, 2007). Significant attitudinal and behavioural differences have been identified between environmental and non-environmental volunteers, including stronger geographic attachment in the former which resulted in greater loyalty to a local area (Randle & Dolnicar, 2006), although participation in conservation volunteering may not necessarily change deep-seated perceptions and attitudes towards nature (Halpenny & Cassie, 2003). For instance, behavioural change, as evidenced by the propensity to engage in environmental volunteering, along with attitudes to the environment, did not change between 2003 and 2009 based on surveys of 14,000 people in England and Wales (Anderson, Lee, Pryce & Taal, 2010). Volunteering is likely to provide quantifiable benefits like increasing work skills that may lead to a better paying job (Alonso & Liu, 2013). Volunteers make a remarkable sacrifice trading the opportunity cost of engaging in other activities in exchange for the common good (Alonso & Liu, 2013). Though student volunteers are less likely than other volunteers to help plan or coordinate services, students are not used exclusively for routine tasks (Edwards, Mooney & Heald, 2001).

The benefits of the volunteer to the organisation are generally well recognised and more tangible than the outcomes for the volunteer. Community volunteer work and involvement is especially crucial in rural areas where human and financial resources are limited (Alonso & Liu, 2013). Although environmental volunteer organisations are experiencing changes in their cultures, structures and funding arrangements, which make the tasks of functioning and attracting volunteers increasingly difficult, many are increasingly reliant on volunteers (Dolnicar, Irvine & Lazarevski, 2008) with some dependent on volunteers for particular skills. Greater recognition of environmental volunteers as co-learners and co-producers of ideas about ways to intervene in ecosystems and their rehabilitation is called for (Buizer, Kurz & Ruthrof, 2012), especially when tertiary sciences students are the volunteers (Haigh, 2006).

Natural Sciences Practicum at Edith Cowan University

Natural Sciences Practicum 1, SCI1120, consists of the equivalent of five days of volunteer work or work experience with an agency, NGO or industry related to the

natural sciences. Students gain practical and hands-on experience, and make a positive contribution to the work that these groups undertake. Although students have considerable flexibility in the type of work undertaken, the emphasis of this first year practicum is on volunteering for a non-profit organisation. Students are encouraged to use this initial experience as the foundation from which to build a network of contacts and a portfolio of extra-curricular experiences during their time at university that will enhance their career prospects. In their third year, students complete a second practicum (SCI3214 Natural Sciences Practicum 2) which is more formal work experience via a ten day placement in an organisation(s) of the type they may typically be employed by upon graduation. This third year practicum is designed as a capstone of their WIL. The SCI1120 links with the SCI3214 unit in third year and some students use the same organisation as they have built that connection.

SCI1120 is a core (compulsory) component of undergraduate degrees in biological sciences, marine and freshwater biology, conservation and wildlife biology, environmental management and environmental science in the School of Natural Sciences at ECU. This unit has been running since 2007 and evolved from other work experience programs which were core components in the environmental management degree for over twenty years. In 2007, it was decided to formally divide these activities into two units: a first year practicum aimed at volunteering and a third year unit focused on formal work experience, a move strongly supported by the course consultative committee (which comprises industry representatives). At the completion of their volunteering, employers or supervisors give a written letter, completed evaluation form and/or standard certificate as evidence of their volunteering efforts. SCI1120 is marked on a pass/fail basis and is not for credit, but is a required unit in the course. There are no credit points associated with SCI1120 as it not equivalent to other units in terms of workload. This strategy is a pragmatic way to ensure each student does some volunteering, but it does impact on resources available to run the unit (although the School does allocate staff time to coordinate and administer the program).

Formal evaluation of the unit commenced in 2012 and will continue in 2013, supported by an ECU Teaching and Learning Grant. Now, students must write a succinct reflective evaluation (answering specific questions). Students are given considerable flexibility and scope in the type of volunteering and choice of the organisations they help. A noticeboard and internal website promoting suitable organisations and volunteer programs is maintained by the coordinator of the practicum and students use this and/or their own contacts to organise a placement suited to their availability and that of the organisation. The coordinator also organises activities (such as plant propagation and revegetation) with local organisations which are more convenient for some students (e.g. international students). Many students volunteer at more than one organisation. Students have the whole academic year to complete their volunteering.

Intended purposes

The two stated student learning outcomes of SCI1120 are: to participate confidently in volunteer or work related activities of a host agency, NGO or industry; and to describe

the relevance and application of activities conducted by the agency, NGO or industry with which they volunteered or undertook work experience. This unit, along with others, targets work readiness. It helps prepare the students with practical knowledge in the field they are interested in working in upon graduation. Students also see the usefulness of this unit in getting a job, because of their work-based training. The organisations in which students volunteer often employ graduates and several graduates have gained employment with the organisation they volunteered with, sometimes supervising/organising other volunteers in a paid capacity.

An intended purpose of the first year practicum is for students to learn about the structures of various environmental groups, their sources of and reliance on funding, and their links to government and other organisations, and to understand how these fit within the broader environmental and conservation industries. NGOs play an important role in the conservation of biodiversity and in promoting the sustainable use of natural resources, ranging from advocacy to 'hands on' action, and they rely heavily on volunteers to perform these functions, often with strong links to local communities (Brightsmith, Stronza & Holle, 2008; Haigh, 2006). Many government agencies (including independent statutory authorities such as zoos and botanical gardens) also rely on volunteers to implement certain programs and activities related to conservation and environmental management. Hence volunteers play a pivotal role in the wider industry in which students seek work upon graduation. The practicum therefore potentially contributes to students' understanding of the social and human dimensions of environmental management - how solving environmental problems is not only about understanding the science and technical aspects, but also how people and organisations work together to solve these problems.

Many students have grasped the idea of volunteering from school and are familiar with the fundamental concept of volunteering being more than direct personal benefit, but also helping others and contributing to a bigger cause. The degree to which these altruistic objectives of the practicum are being met is difficult to gauge at this stage, but we hope to learn more about this from further analysis of students' personal reflections and formal evaluations which commenced in 2012.

SCI1120 students are required to do at least 5 days volunteering which translates to 30-40 volunteer hours per student over the calendar year. On average, students do more hours than the minimum required, which demonstrates a degree of commitment to volunteering and the organisations they work for. For instance, in 2010 each student averaged 60 hours of volunteering, whilst in 2012 this average was 49 hours, with several students doing more than one placement. One student did 120 volunteer hours with the community group of Lord Howe Island weed eradication program. Another student did 300 volunteer hours with RSPCA in 2010 and several students did more than 100 volunteer hours for Department of Environment and Conservation (DEC) working at Monkey Mia with dolphins.

Letters and evaluations from the organisations almost always give positive feedback that students have made worthwhile contributions with a good attitude. In 2012, 55% of supervisors gave highly complimentary feedback, whilst 34% were generally positive and

the remaining 11% gave neutral or no feedback (i.e. they used standard letters or certificates of acknowledgment). Organisations that rely on volunteers sometimes ask for more volunteers, suggesting that their experience has been positive.

Types of activities done by SCI1120 students

Students tend to choose volunteer work that is related to their course. For example, biology students tend to go to zoos and veterinarians. Native animal rescue and rehabilitation centres are popular for students studying conservation and wildlife biology. Marine biology students mostly volunteer doing general tasks like restoration and rehabilitation, especially of coastal dunes, and sometimes they do survey work with government fisheries and marine organisations.

If students are more interested in genetics and molecular biology, they try to find work in laboratories. Indeed, it is the laboratory-style biology students who have the most trouble finding suitable placements and tend not to choose community groups. In such cases, students may undertake activities that are more like work experience than volunteering. Although there is considerable flexibility in the type of experience, and this can be tailored to students' courses and aspirations, the emphasis is on volunteering, with the unit outline stating that students should be working with a community group.

In 2010, 44 SCI1120 students did a total of 2,659 volunteer hours across 49 placements. Most volunteered to do bushland care and ecosystem restoration or wildlife care and rehabilitation (Table 1). The percentage breakdown by type of activity was similar for 2012 students (Figure 1).

Table 1: Types of volunteer activities done by SCI1120 students in 2010

| Types of volunteer activities | Number of hours | Number of placements | Examples of activities |
|----------------------------------|-----------------|----------------------|---|
| Wildlife care and rehabilitation | 1287 (48%) | 19 (39%) | Animal care and rehabilitation, assisting research, animal monitoring (e.g. turtles, birds) |
| Bushcare/ restoration | 827 (31%) | 18 (37%) | Weed control, track maintenance, planting, survey |
| Marine/ coastal | 305 (12%) | 7 (14%) | Dune rehabilitation, assisting research projects, aquaculture |
| Other | 240 (9%) | 5 (10%) | |
| Total | 2659 | 49 | |

Types of organisations in which SCI1120 students volunteered

Altogether, in the order of 2000-4000 volunteer hours (depending on number of students enrolled) are provided annually through this first year practicum, mostly to community and government-based environmental/conservation organisations. In 2010, half the SCI1120 students volunteered in non-government organisations (NGOs), whereas in 2012

this increased to 67%. State and local government were also popular with students, as many government agencies have specific programs or activities tailored to volunteers (Table 2 and Figure 2).

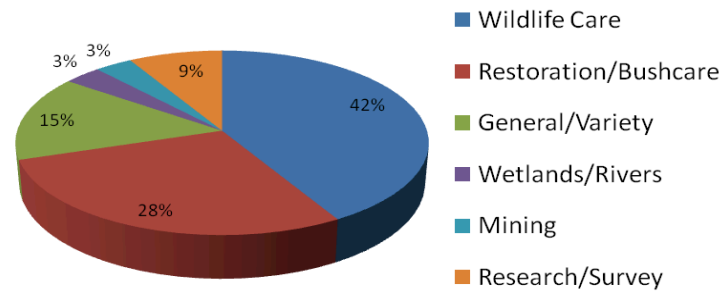


Figure 1: Types of volunteer activities done by SCI1120 students in 2012 (% of students)

Table 2: Types of organisations in which SCI1120 students volunteered in 2010

| Types of organisations | Number of hours | Number of placements | Main organisations |
|------------------------|-----------------|----------------------|--|
| NGO | 1297 (49%) | 22 (46%) | Conservation Volunteers (11), Kanyana Wildlife Sanctuary (4), other sanctuaries, RSPCA |
| State Government | 526 (20%) | 8 (17%) | DEC |
| Commercial/industrial | 336 (12%) | 6 (13%) | Environmental Consultancies, plant nurseries |
| Community group | 260 (10%) | 5 (10%) | Friends' groups, catchment groups |
| Research organisation | 135 | 5 | ECU, other university |
| Local government | 60 | 2 | City of Wanneroo, City of Stirling |
| Other | 45 | 1 | |
| Total | 2659 | 48 | |

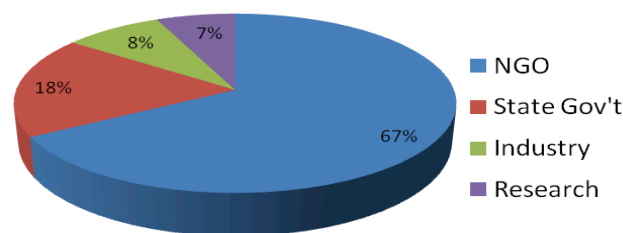


Figure 2: Types of organisations where ECU students volunteered in 2012 (% of students)

Older students view the practicum more strategically than the younger students in that they see it as practical work orientated to getting a paid job. Younger students see it more like volunteering with a community-based organisation. Most commonly, students work with organisations that specialise in the supply of volunteers for particular projects for local government and other organisations, particularly in environmental management and conservation. For example, Conservation Volunteers Australia (CVA) are well organised, have activities almost every day, as well as week-long programs in various parts of the country, and focus on hands-on, restoration type work such as weed control and track maintenance. Some students tap into local community groups doing active bushland management. Volunteers are often attracted to charismatic mega-fauna (Campbell & Smith, 2005) and volunteering for wildlife sanctuaries and zoos is popular across all courses. Some wildlife sanctuaries that deal with injured animals have too many volunteers and only take students who are keen and committed to a long-term investment of themselves and their time.

Others types of organisations where students have volunteered include: 1) international organisations specialising in providing volunteers for research and conservation projects, such as Earthwatch, Projects Abroad and Raleigh International (for which there is often an associated fee and may be considered a type of volunteer tourism) (Cousins, 2007; Haigh, 2006); 2) government departments and agencies with formal volunteering programs (e.g. Kings Park and Botanic Gardens, Perth Zoo, Department of Environment and Conservation's *Nearer to Nature Program*); 3) environmental activist and campaigning groups (e.g. The Wilderness Society, Friends of the Earth); 4) community-based conservation groups (e.g. 'Friends' groups involved in managing local bushland reserves; and 5) universities where students assist with research projects (including helping postgraduate students). The School of Natural Sciences, specifically the coordinator of the practicum, has also organised and run ecological restoration activities for students, including propagation and planting in local bushland and elsewhere in conjunction with other organisations (e.g. dune restoration with Town of Mosman Park).

Locations where SCI1120 students volunteered

In 2010, nearly three quarters of the SCI1120 students volunteered in and around Perth where they were studying. Although only 16% of student placements were in regional WA, these accounted for about 1/3 of total hours indicating students did more hours when involved in regional and rural activities. A reasonable number of students did their volunteer work overseas, including in developing countries (Table 3).

Table 3: Locations in which SCI1120 students volunteered in 2010

| Location | Number of hours | Number of placements | |
|---------------------|-----------------|----------------------|---|
| Perth and surrounds | 1297 (56%) | 35 (73%) | |
| Regional WA | 526 (32%) | 8 (16%) | Monkey Mia/Shark Bay, Pilbara, South West |
| Overseas | 336 (12%) | 6 (12%) | India, Thailand, Africa, Lord Howe |
| Total | 2659 | 49 | |

Many students are prepared to travel some distance and often to remote areas, usually at their own expense, to volunteer on projects which they feel are worthwhile, and this is important given regional and remote areas and projects are generally more dependent on volunteers than those based in urban centres (Alonso & Liu, 2013; Brightsmith et al., 2008; Cousins, 2007).

Student attitudes

Although some 90 students enrolled in SCI1120 at the start of 2012, only 34 had completed both the pre-experience and post-experience survey as of February 2013 (Table 4). Several students are yet to complete their volunteering (grade on hold), withdrew from the unit or course during the year, or did not, for a variety of reasons, complete both questionnaires. Of those responding to both surveys, the vast majority found the experience highly enjoyable and most thought that their volunteering experiences were highly valuable to their host organisation (score of 4 or above; Table 4). Although some 38% of students found the experience gave only modest value to their university studies (reasonable benefit), a higher proportion (56%) found the experience to be highly beneficial to their studies, with two students reporting no benefits (Table 4).

Some 41% of responding students saw few to reasonable advantages of the experience in gaining employment (score of 2 or 3). Whereas 59% responded that they believed that their volunteering experience was highly beneficial in gaining employment (Table 4). Compared to the anticipated benefits reported in the pre-experience survey at the start of 2012, students responded that they perceived the actual experience was less useful than expected in terms of contributing to university study, was less enjoyable than expected and the work was clearly easier than anticipated. However, the experience exceeded expectations, on average, in terms of usefulness to organisation (slight improvement) and in perceived job prospects (Table 4).

Table 4: Summary of student survey responses on how they valued their first year practicum experience in 2012

| | Useful for university study | | Useful to host organisation | | Useful for getting a job | | Enjoyed the experience | | The work was hard | |
|-------------------|-----------------------------|-------------|-----------------------------|-------------|--------------------------|-------------|------------------------|-------------|-------------------|-------------|
| | Pre survey | Post survey | Pre survey | Post survey | Pre survey | Post survey | Pre survey | Post survey | Pre survey | Post survey |
| Extremely so (5) | 14 | 4 | 11 | 12 | 3 | 6 | 8 | 7 | 20 | 1 |
| Very much so (4) | 15 | 15 | 15 | 13 | 4 | 14 | 16 | 15 | 10 | 8 |
| Reasonably so (3) | 5 | 13 | 6 | 9 | 21 | 12 | 10 | 9 | 4 | 15 |
| A little (2) | 0 | 2 | 2 | 0 | 5 | 2 | 0 | 3 | 0 | 6 |
| Not at all (1) | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 4 |
| No. of responses | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 |
| Mean score (0-5) | 4.26 | 3.62 | 4.03 | 4.09 | 3.09 | 3.71 | 3.94 | 3.76 | 4.47 | 2.88 |

Notes: Numbers of responses received and mean score (0-5) are given for post-experience and pre-experience surveys (where students were asked about the anticipated benefits of the practicum).

Data set is restricted to students who completed both pre- and post- surveys.

Although student evaluations are yet to be fully analysed, including their responses to open ended questions, it is clear that many students reflect positively on their experiences. Below are some examples of student comments on the benefits of the experience.

A good insight into the role and scope of work of conservation establishment – contacts with people in industry & clarification of the direction I want to focus on after study.

A sense of confidence in what I have to offer to future employers, and that I am on the right track in terms of really enjoying the career path I have chosen.

I met many people that shared the same passions as me and I never stopped learning. Every phone call was different and it gave me the opportunity to learn things that I wouldn't be able to at Uni, like what to do if an animal was in danger or in your backyard; how to deal with that situation and to be able to calm someone down over the phone and help them. It taught me how to cope under stressful situations.

I got an amazing five days in a paradise of blue oceans and sunshine days. I learnt a lot about the animals in the area, as well identifying them and their behaviours. As well as an insight to the regulations that have to be maintained to keep a normal ecosystem running with a mass amount of tourists.

It was very enjoyable and helped me understand what it's like working out in the field of conservation. Being directly involved in conservation and wildlife projects was a great learning experience for me personally and for my career.

Many students responded to questions on the value of the experience with specific information on what they did and what they learnt (as opposed to more generic skills and outcomes). Most students indicated they would do more volunteer work in the future.

Although the results presented here are only preliminary, with more data to be analysed and collected, results do suggest that some students are not seeing the prospective link between their experiences and their future studies at university and employment after university. This is somewhat disappointing as these form part of the stated and unstated objectives of the practicum experience. The fact that students are often doing manual and routine tasks during their volunteering (e.g. planting, weeding, feeding, and cleaning) may have influenced their view of their experience and the perceived mismatch with the types of jobs they desire upon graduation (which are likely to be more professional roles). Appreciation of the importance of community-based NGO's to the environment and conservation sector was one thing we hoped students would gain from the practicum experience, and it would be interesting to also survey third-year students and recent graduates on this topic and to compare their experiences and opinions of the volunteering experience with that of the first years. This is also important because the first year practicum is only one component of WIL integrated into their courses. Some other objectives of the first-year practicum however are clearly being met, such as making a

worthwhile to strong contribution to the organisations that students volunteer for. In this fashion, the program also contributes towards community engagement goals set by the university.

Summary

This paper describes first year university science students doing five days of practicum via environmental volunteering as an innovative model of WIL via a compulsory component of their course. The three criteria of free will, non-pecuniary motivation and benefit to others can be applied to any action to assess whether it is volunteerism or not (Hockenos, 2011). The Natural Sciences practicum at ECU certainly meets two of these criteria in terms of no payment and benefits to the organisation with which they are volunteers. The compulsory nature of the practicum is seemingly at odds with the concept of volunteering; however the obligation is in terms of the minimum number of hours, with students given a very wide choice in the nature of activity and organisation, with many opting to do more hours than required. Although students gaining university credit are not volunteers by ABS definition, the practicum is designed as one component of an integrated program of WIL within the courses, and one which reflects the importance of volunteering to the industry which graduates will enter. Description of this example in this paper has shown how students' environmental volunteering in Natural Sciences at ECU fits both volunteering and workplace integrated learning (WIL), despite models and definitions in literature being less inclusive.

Specifically, the practicum makes an important contribution to environmental volunteering in terms of providing substantial volunteer hours to an industry and organisations which are increasingly reliant on volunteers to reach their specific operational objectives, as well as to achieve broader sustainability and biodiversity conservation goals. The student's work is generally highly valued by the organisations for its quality and relevance. There is also some preliminary evidence of benefits to the students involved, including the perception by most students of an improvement in employability. Overall most students found the experience to more beneficial than expected in improving their job prospects upon graduation, although it was less useful than they anticipated for their university studies. This suggests the experience may generally be more targeted towards altruism and the development of field-based skills and confidence than any major enhancement in academic understanding.

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